

**Welcome to  
The Third Meeting of the  
NGNGV Program's Vehicle Working Group**



Sponsored by DOE/NREL  
March 12 & 13, 2001  
Diamond Bar, CA



# Thanks!

This meeting has been organized by:

- Kevin Walkowicz, NREL
- Denny Stephens, Battelle
- Elizabeth Dolan, Center.Edge, LLC
- Paul Norton, NREL
- Jennifer Elling, NREL
- Kathee Roque, NREL
- Mike Bogdanoff, SCAQMD
- Mary Kos, GTI
- Cricket Pierce, NREL



# **Tentative Date for Next NGNGV Meeting**

**Week of October 15**

**Location TBD**



## Meeting Objectives

- Focus on the future: Discuss the direction of the NGNGV Program in the light of recent developments
- Present Phase 1 RFP and hold Bidders' Conference
- Present the NGNGV Website and get your feedback



## Meeting Outcomes

- Your input on the revised program plan
- Bidders questions and responses
- You understand how to use website
  - For program information
  - To provide input
  - To get the RFP



# Meeting Agenda

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Monday: 1:00 - 5:30

Break: ~ 3:00

Bidders' Conference: 4:00 – 5:30

Cash Bar – 6:00 - 7:00

DB's Grille, Holiday Inn Select

Dinner Hosted by NREL - 7:00 - 8:30

Gateway 2&4, Holiday Inn Select

Tuesday: 8:00 – 12:00

Break: ~10:15

Adjourn: by 12:00

Lunch: 12:00 - 1:00



# Meeting Agenda

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## Monday

Welcome, Introduction and Objectives

Paul Norton

New Directions for the NGNGV Program

Kevin Walkowicz  
Kevin Stork

NGNGV Website

Jen Elling

Bidders' Conference

Kathee Roque  
Kevin Walkowicz





# Meeting Agenda

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## Tuesday

Summary of Bidders' Conference

Kathee Roque  
Kevin Walkowicz

Discussion of New Directions

All

Summary and Next Steps for NGNGV

Kevin Walkowicz



# Meeting Logistics




# **The NGNGV Program as of the Last Meeting of this Group.....**



## Program Objectives

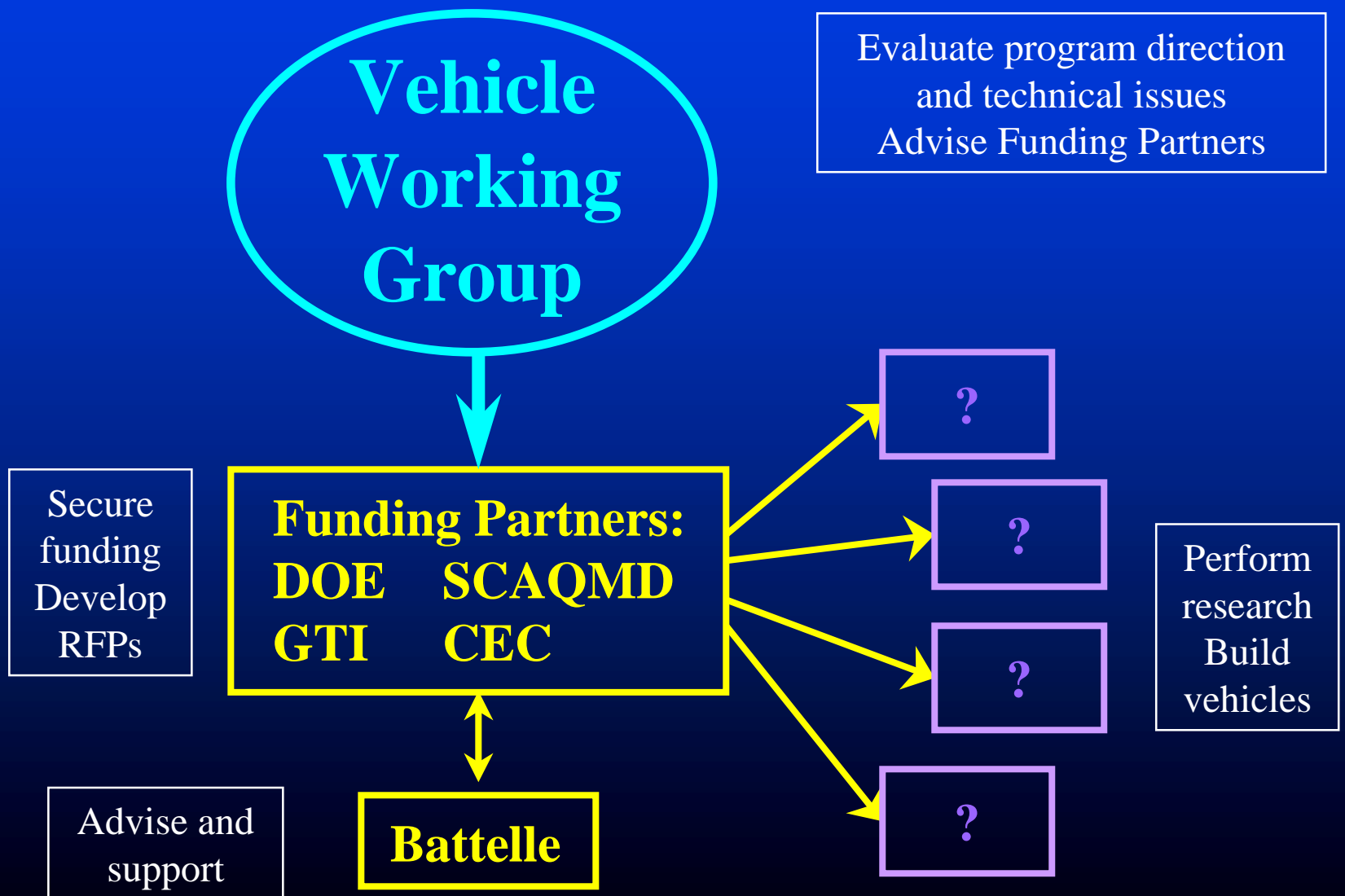
**One medium-duty (Class 3-6) CNG vehicle and  
one heavy-duty (Class 7-8) LNG vehicle  
will be available in 2004 that:**

- Advance DOE natural gas and heavy-vehicle technologies
- Implement advanced engine technology
- Represent a significant step change NG vehicle technology
- Have NO<sub>x</sub> emission levels below 0.5 g/bhp-hr and PM emissions below 0.01 g/bhp-hr - significantly below EPA emissions standards for 2004
- Are competitive with conventionally fueled vehicles in performance and life-cycle economics
- Are technically and commercially viable
- Aid Nonattainment Areas in reducing pollutant emissions from vehicles



**This Vehicle Working Group  
is the advisory body of the  
NGNGV Program!**

# NGNGV Program Structure



# Two Phases of Research



Phase 1  
FY2001  
Emission Technology  
Conceptual Design

**Phase 1**  
**Task A: Emission Technology**  
Develop options for meeting the  
ambition emissions goals of the  
program

**Task B: Conceptual Design**  
Develop preliminary designs and  
market introduction strategies

## Two Phases of Research

### Phase 2

Development of two prototype vehicles to be put in service on on-road development in 2004.

- Class 3-6 CNG Vehicle
- Class 7-8 LNG Vehicle

Phase 2  
2002  
Prototype Vehicles





## Two Phases of Research

Phase 1  
FY2001  
Emission Technology  
Conceptual Design

Phase 2  
FY2002  
Prototype Vehicles

# Two Phases of Research





# Program Timeline

## Year 2000

- ✓ • Launch Program
- ✓ • Form Working Group
- ✓ • Gather recommendations
- ✓ • Secure 2001 Funding

☑ DOE

☑ GTI

☑ SCAQMD



# Program Timeline

## Year 2001

- ✓ • Release Phase 1 RFP
- Initiate Phase 1 Research
- Gather Phase 2 Recommendations
- Continue discussions with potential customers
- Secure 2002 Funding



# Program Timeline

## Year 2001

- ✓ • Release Phase 1 RFP
- Initiate Phase 1 Research
- Gather Phase 2 Recommendations
- Continue discussions with potential customers
- Secure 2002 Funding



# Program Timeline

## Year 2002

- Prepare Specifications for Vehicles
- Release Phase 2 RFP
- Initiate and monitor vehicle design and build contracts
- Continue discussions with potential customers
- Secure 2003 Funding



## Program Timeline

### Year 2003

- Continue vehicle design and build contracts
- Identify sites for prototypes and coordinate infrastructure
- Prepare prototype testing and evaluation plan
- Continue discussions with potential customers
- Secure 2004 Funding





## Program Timeline

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### Year 2004

- Produce production intent prototype vehicles
- Place prototypes in revenue service for further development and evaluation
- Commercial products in 2005
- Facilitate customer/supplier interactions



## **New NREL Lead for NGNGV**

### **Kevin Walkowicz**

- **Joined NREL as a Senior Engineer in January**
- **Previously a Fuel System Development Engineer and a Fuel System Design Release Engineer with General Motors. He has also worked for Chrysler**
- **BS in Mechanical Engineering Lawrence Technological University in Southfield, Michigan. Working on MS from Rensselaer Polytechnical**
- **Kevin is the NREL Task Leader for Alternative Fuels for Heavy Vehicles**



## Goals

- Role is to provide point of contact for NGNGV program and provide direction and leadership
- NGNGV goal is to produce 1 prototype Class 3-6 CNG and 1 prototype Class 7-8 LNG
- Final vehicles should be commercially viable and competitive with conventionally fueled vehicles
- Final vehicles will have the same or lower emissions levels as conventionally fueled vehicles



## Goals

- NGNGV will be communicated via the website
- Current and Future RFP's will be the results of discussions within the NGNGV working group
  - This is the purpose of these types of meetings



## New Directions

- EPA adopted 2007 emissions standards
  - 0.2 g/bhp-hr NO<sub>x</sub> is definitely a ‘stretch’
  - Other regulated emissions also tough
  - Programs targeted for 2006/2007 should have 0.2 g/bhp-hr NO<sub>x</sub> and .001 g/bhp-hr PM targets (must meet 2007 standard)
  - Earlier rollouts could have 0.5 g/bhp-hr NO<sub>x</sub> and .01 g/bhp-hr PM targets



## New Directions

- New DOE GPRA target timeline
  - Based on funding and manpower availability
- Change in DOE NGNGV leadership
  - Kevin Stork is DOE Program Manager for Heavy Duty Alternative Fuels Research
    - Formerly of Argonne National Lab
    - Significant involvement in the NG programs
    - New position is responsible for DOE OHVT Alternative Fuel programs





## Opportunities for the NGNGV Program

- Change in GPRA targets for 2001 and beyond regarding NGNGV
  - (1) By 2004, develop a Class 3-6 compressed natural gas (CNG) production-ready prototype vehicle that is fully compatible in cost and performance to its conventionally-fueled counterparts
  - (2) by 2007, develop a Class 7-8 liquefied natural gas (LNG) production-ready prototype vehicle that is fully compatible in cost and performance to its conventionally-fueled counterparts





## Opportunities for the NGNGV Program

- Reasons for moving targeted timeline back for Class 7-8
  - Technology ‘readiness’ for HD LNG
  - What does industry want to deliver and when
  - DOE Funding for future years
    - Financial needs to do 2 vehicle builds in FY2002/2003
    - FY02 funding is flat
    - FY03 funding expected



## Opportunities for the NGNGV Program

- Class 3-6 CNG is still targeted for 2004 but will depend on results of Phase 1 RFP and FY2002 funding
  - Technology ‘readiness’ for MD CNG
    - What does industry want to deliver and when
  - DOE Funding for future years
    - Financial needs to do 2 vehicle builds in FY2002/2003
    - FY02 funding is flat
    - FY03 funding expected



## New Directions

- The Good News is:

Phase 1 RFP has not changed !

- Task A: Technology Assessment
  - What, When & How
- Task B: Concept Design Development
  - What is best vehicle for each class

Will Discuss Phase 1 RFP during Bidders  
Conference @ 4pm



## New Directions

Phase 1  
FY2001  
Emission Technology  
Conceptual Design

### Phase 1

**Task A: Emission Technology**  
Develop options for meeting the  
ambition emissions goals of the  
program

**Task B: Conceptual Design**  
Develop preliminary designs and  
market introduction strategies



## New Directions

### Phase 2

Development of two prototype vehicles to be put in service on on-road development in 200?.

- Class 3-6 CNG Vehicle
- Class 7-8 LNG Vehicle

Phase 2  
2002-2006  
Type Vehicles



## New Directions

- 3 Proposed Strategies for NGNGV Phase 2
  - Considerations included:
    - Market outlook
    - Pending legislation
    - Natural gas vs conventional fuel prices
    - Funding from various organizations
    - Availability of technology/Ability to meet goals



## New Directions

- 3 Possible Scenarios
- Scenario 1 – MD and HD possible in 2004
- Scenario 2 - HD not possible now –wait until 2006 or 2007 to deliver vehicle, MD in 2004
- Scenario 3 – MD and HD not feasible for 2004 delay both vehicle builds





## New Directions

- Scenario 1 - HD and MD possible in 2004
  - Task A results show significant promise for both
  - Funding becomes available for 2 vehicles
  - Industry wants vehicles in 2004 with 0.5 g NO<sub>x</sub>



## New Directions

- Scenario 2 - HD not possible now –wait until 2006 or 2007 to deliver vehicle, deliver MD in 2004
  - Task A shows no promise for HD delivery in 2004, 2005
  - Will alleviate some funding concerns
  - Could kick off HD engine development with 2002 FY funding
  - MD could still be feasible and pursued



## New Directions

- Scenario 3 – MD and HD not feasible for 2004 delay both vehicle builds
  - Neither MD or HD shows promise from task A
  - Industry can wait until 2005 as soonest
  - Funding could be more flexible
  - 2002 FY would fund engine dev. only